

INTERACTIONS BETWEEN ENVIRONMENT AND THE IMMUNE SYSTEM IN DEVELOPMENT OF ALLERGIES

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Background and Aims

Environmental factors may affect the development of atopic dermatitis, and this has been described to be already effective during pregnancy. The aim of the study was to determine prospectively whether the timing of exposures, prenatal and postnatal, especially the introduction of complementary food during the first year of life, is associated with the development of atopic dermatitis according to different ages of onset. We further analysed the association between the expression of innate immune genes at birth and atopic dermatitis.

Methods: 1056 children who participated in a birth cohort study (PASTURE/EFRAIM) were included in this study. Atopic dermatitis (AD) was defined by doctor's diagnosis reported by the parents up to 4 years of age in combination with a SCORAD score indicative for atopic dermatitis at 1 year of age. Feeding practices were reported by parents in monthly diaries between the 3rd and 12th month of life. Gene expression of Toll-like receptors (TLRs) and CD14 were assessed in cord blood leucocytes by quantitative PCR.

Results: Prenatal exposure to farm animals and cats was associated with a decreased risk of developing early onset (during the first year of life) AD, but not with AD with first manifestations after the first year of life. The diversity of complementary food introduced in the first year of life was associated with a reduction of the risk of having late onset AD. Elevated expression of TLR5 and TLR9 in cord blood was associated with a decreased risk for doctor's diagnosis of AD. A significant interaction between polymorphisms in *TLR2* and prenatal cat exposure was observed on atopic dermatitis.

Conclusions: The timing of exposure has an influence on the development of atopic dermatitis in children according to the age of onset. Our results suggest a role of the innate immune system in mediating the protective effect of prenatal exposures and a slight effect of gene-environment interaction on the development of atopic dermatitis.